altherma by DAIKIN

# INSTALLATION MANUAL

## Outdoor unit for air to water heat pump

**ERYQ005ABV3**
**ERYQ006ABV3**
**ERYQ007ABV3**

## CONTENTS



READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLATION. KEEP THIS MANUAL IN A HANDY PLACE FOR FUTURE REFERENCE.

IMPROPER INSTALLATION OR ATTACHMENT OF EQUIPMENT OR ACCESSORIES COULD RESULT IN ELECTRIC SHOCK, SHORT-CIRCUIT, LEAKS, FIRE OR OTHER DAMAGE TO THE EQUIPMENT. BE SURE ONLY TO USE ACCESSORIES MADE BY DAIKIN WHICH ARE SPECIFICALLY DESIGNED FOR USE WITH THE EQUIPMENT AND HAVE THEM INSTALLED BY A PROFESSIONAL.

IF UNSURE OF INSTALLATION PROCEDURES OR USE, ALWAYS CONTACT YOUR DAIKIN DEALER FOR ADVICE AND INFORMATION.

## SAFETY PRECAUTIONS

- This manual classifies the precautions into WARNING and CAUTION. Be sure to follow all the precautions below: they are all important for ensuring safety.

Failure to follow any of WARNING is likely to result in such grave consequences as death or serious injury.

Failure to follow any of CAUTION may in some cases result in grave consequences.

- The following safety symbols are used throughout this manual.

Be sure to observe this instruction.

Be sure to establish an earth connection.

Never attempt.

- After completing installation, test the unit to check for installation errors. Give the user adequate instructions concerning the use and cleaning of the unit as included in the operation manual of the indoor unit.

### Warnings

- Installation should be left to the dealer or another professional.
  Improper installation may cause water leakage, electrical shock, or fire.
- Install the outdoor unit according to the instructions given in this manual.
  Incomplete installation may cause water leakage, electrical shock, or fire.
- Be sure to use the supplied or specified installation parts.
  Use of other parts may cause the unit to vibrate loose, and may cause water leakage, electrical shock, or fire.
- Install the outdoor unit on a solid base that can support the weight of the unit.
  An inadequate base or incomplete installation may cause injury in the event the unit falls off the base.
- Electrical work must be carried out in accordance with the installation manual and the national electrical wiring rules or code of practice.
  Insufficient capacity or incomplete electrical work may cause electrical shock or fire.
- Be sure to use a dedicated power circuit. Never use a power circuit shared by another appliance.
- For wiring, use a cable long enough to cover the entire distance with no connection. Do not use an extension cord. Do not put other loads on the power supply, use a dedicated power circuit.
  Failure to do so may cause abnormal heat, electric shock, or fire.
- Use the specified types of wires for electrical connections between the indoor and outdoor unit.
  Firmly clamp the interconnecting wires so that their terminals receive no external stress. Incomplete connections or clamping may cause terminal overheating or fire.
- After connecting the interconnecting and supply wiring, be sure to shape the cables so that they do not put undue force on the electrical covers or panels.
  Install covers over the wires. Incomplete cover installation may cause terminal overheating, electrical shock, or fire.
- If any refrigerant has leaked out during the installation work, ventilate the room.
  The refrigerant produces a toxic gas if exposed to flames.
- After all installation is complete, check to make sure that no refrigerant is leaking.
  The refrigerant produces a toxic gas if exposed to flames.
- When installing or relocating the system, be sure to keep the refrigerant circuit free from substances other than the specified refrigerant (R410A), such as air.
  Any presence of air or other foreign substance in the refrigerant circuit causes an abnormal pressure rise or rupture, resulting in injury.
- During pump down operation, stop the compressor before removing the refrigerant piping.
  If the compressor is still running and the stop valve is open during pump-down, air will be sucked in when the refrigerant piping is removed, causing abnormal pressure in the freezer cycle which will lead to breakage and even to injury.

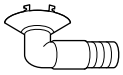
- During installation, attach the refrigerant piping securely before running the compressor.
  If the compressor is not attached and the stop valve is open during pump-down, air will be sucked in when the compressor is running, causing abnormal pressure in the freezer cycle which will lead to breakage and even to injury.
- Be sure to establish an earth. Do not earth the unit to a utility pipe, surge absorber, or telephone earth.
  Incomplete earth may cause electrical shock. A high surge current from lightning or other sources may cause damage to the outdoor unit.
- Be sure to install an earth leakage circuit breaker.
  Failure to do so may cause electrical shock.

### Cautions

- Do not install the outdoor unit in a place where there is danger of exposure to inflammable gas leakage.
  If the gas leaks and builds up around the unit, it may catch fire.
- Note for installing the outdoor unit.
  In cold areas where the outside air temperature remains below or around the freezing-point for a few days, the outdoor unit's drain may freeze. If so, it is recommended to install a heater tape in order to protect drain from freezing.
- Tighten the flare nut according to the specified method such as with a torque wrench.
  If the flare nut is tightened too hard, the flare nut may crack after a long time and cause refrigerant leakage.

## ACCESSORIES

Accessories supplied with the outdoor unit:

| | | |
|---|---|---|
|  | Drain plug<br>Included on the bottom of the packing case. | 1 |
|  | Installation manual | 1 |

## INSTALLATION GUIDELINES

### Precautions for selecting the location

**WARNING**

- Make sure to provide for adequate measures in order to prevent that the outdoor unit be used as a shelter by small animals.
- Small animals making contact with electrical parts can cause malfunctions, smoke or fire. Please instruct the customer to keep the area around the unit clean.

- Choose a place solid enough to bear the weight and vibration of the unit, where the operation noise will not be amplified.
- Choose a location where the hot air discharged from the unit or the operation noise will not cause a nuisance to the neighbours of the user.
- Avoid places near a bedroom and the like, so that the operation noise will cause no trouble.
- There must be sufficient space for carrying the unit into and out of the site.
- There must be sufficient space for air passage and no obstructions around the air inlet and the air outlet.
- The site must be free from the possibility of flammable gas leakage in a nearby place.
- Locate the unit so that the noise and the discharged hot air will not annoy the neighbours.
- Install units, power cords and inter-unit cables at least 3 m away from television and radio sets. This is to prevent interference to images and sounds.
- Depending on radio wave conditions, electromagnetic interference may still occur even if installed more than 3 m away.
- In coastal areas or other places with salty atmosphere of sulfate gas, corrosion may shorten the life of the outdoor unit.
- Since drain flows out of the outdoor unit, do not place anything under the unit which must be kept away from moisture.

**NOTE** Units cannot be installed hanging from ceiling or stacked.

### Selecting a location in cold climates

**CAUTION**

When operating the outdoor unit in a low outdoor ambient temperature, be sure to follow the instructions described below.

- To prevent exposure to wind, install the outdoor unit with its suction side facing the wall.
- Never install the outdoor unit at a site where the suction side may be exposed directly to wind.
- To prevent exposure to wind, install a baffle plate on the air discharge side of the outdoor unit.
- In heavy snowfall areas, select an installation site where the snow will not affect the unit.

Construct a large canopy.

Construct a pedestal.

Install the unit high enough off the ground to prevent burying in snow.

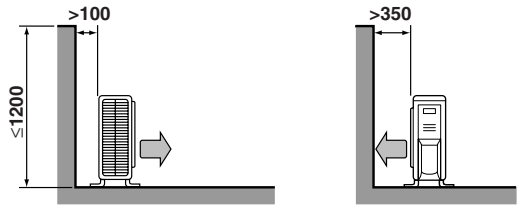
## Refrigerant piping specifications

| Refrigerant piping specifications | |
|---|---|
| Maximum allowable piping length between outdoor unit and indoor unit | 30 m |
| Minimum required piping length between outdoor unit and indoor unit | 3 m |
| Maximum allowable height difference between outdoor unit and indoor unit | 15 m |
| Additional refrigerant required for refrigerant pipe exceeding 10 m in length | 20 g/m |
| Gas pipe - outer diameter | 15.9 mm (5/8") |
| Liquid pipe - outer diameter | 6.4 mm (1/4") |

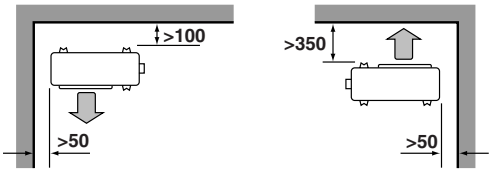
## Installing near a wall or obstacle

- Where a wall or other obstacle is in the path of the outdoor unit air intake or exhaust airflow, follow the installation guidelines below.
- For any of the installation patterns below, the wall height on the exhaust side should be 1200 mm or less.

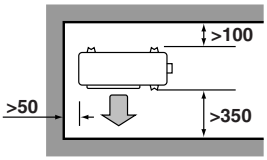
### Wall facing one side (unit: mm)



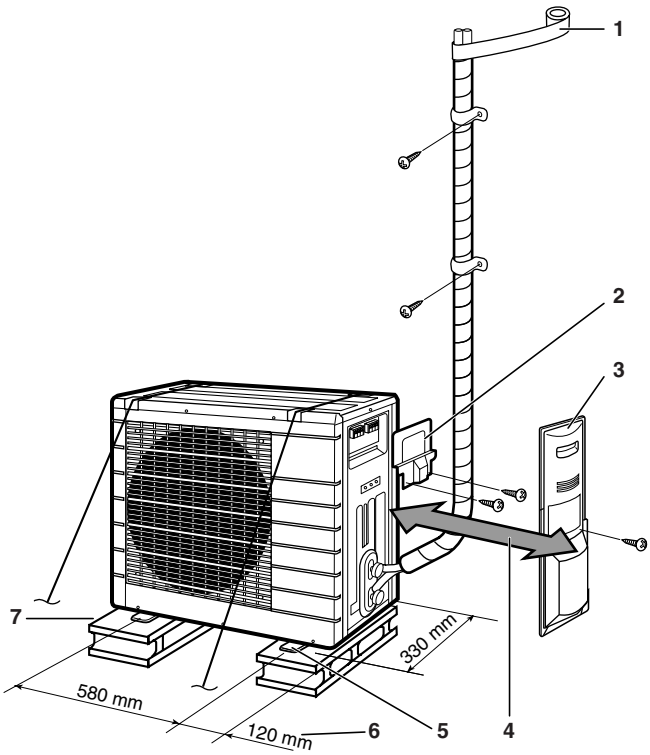

### Walls facing two sides (unit: mm)




### Walls facing three sides (unit: mm)




## Outdoor unit installation drawing




**1** Wrap the insulation pipe with finishing tape from bottom to top.

**2** Service cover

**3** Stop valve cover

**4** 250 mm from wall. Allow space for piping and electrical servicing.

**5** If there is danger of the unit falling or overturning, fix the unit with foundation bolts, or with wire or other means.

**6** Distance from the outer side of the stop valve cover

**7** If the location does not have good drainage, place the unit on block bases. Adjust foot height until the unit is levelled. Failure to do so may result in water leakage or accumulation.

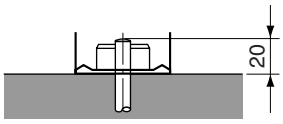
## Mounting the outdoor unit

When installing the outdoor unit, please refer to "Installation guidelines" on page 2 to select an appropriate location.

1 Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.

2 Prepare 4 sets of M8 or M10 foundation bolts, nuts and washers each (field supply).

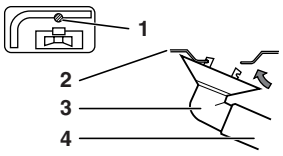
3 Fix the unit securely by means of the foundation bolts in accordance with the foundation drawing.
It is best to screw in the foundation bolts until their length remains 20 mm above the foundation surface.




## Drain work

If drain work is necessary, follow the guidelines below.

- Install the drain plug for drainage.
- If the drain port is covered by a mounting base or floor surface, place additional foot bases of at least 30 mm in height under the outdoor unit's feet.
- In cold areas, do not use a drain hose with the outdoor unit. Otherwise, drain water may freeze, impairing the heating performance. In case the use of a drain hose is unavoidable for one reason or another, it is recommended to install a heater tape in order to protect drain from freezing.



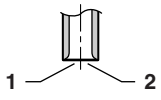

1 Drain-water hole
2 Bottom frame
3 Drain plug
4 Hose (field supply, inner diameter 16 mm)

## Flaring the pipe end

To flare each pipe end, follow the procedure below:

1 Cut the pipe end with a pipe cutter.

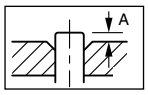
2 Remove burrs with the cut surface facing downward so that the chips do not enter the pipe.




1 Cut exactly at right angles.
2 Remove burrs

3 Remove the flare nut from the stop valve and put the flare nut on the pipe.

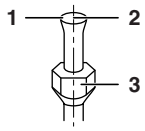
4 Flare the pipe. Set exactly at the position shown below.




| | | Conventional flare tool | |
|---|---|---|---|
| | Flare tool for R410A (clutch type) | Clutch type ("Ridgid") | Wing nut type ("Imperial") |
| A | 0~0.5 mm | 1.0~1.5 mm | 1.5~2.0 mm |

5 Check that the flaring is properly made.

1 Flare's inner surface must be flaw-free.
2 The pipe end must be evenly flared in a perfect circle.
3 Make sure that the flare nut is fitted.

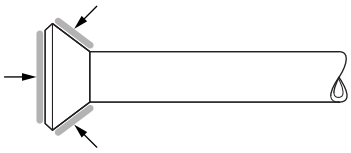



## Connecting the refrigerant piping to the outdoor unit

**CAUTION**

- Do not use mineral oil on flared part.
  Mineral oil getting into the system would reduce the lifetime of the units.
- Never use piping which has been used for previous installations. Only use parts which are delivered with the unit.
- Do never install a drier to this R410A unit in order to guarantee its lifetime. The drying material may dissolve and damage the system.
- Incomplete flaring may cause refrigerant gas leakage.

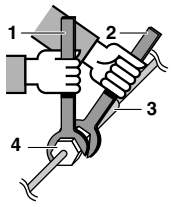
1 To prevent gas leakage, apply refrigeration machine oil on both inner and outer surfaces of the flare (use refrigeration oil for R410A).



2 Align the centres of both flares and tighten the flare nuts 3 or 4 turns by hand. Then tighten them fully with torque wrenches.

Use torque wrenches when tightening the flare nuts to prevent damage to the flare nuts and to prevent escaping of gas.

1 Torque wrench
2 Spanner
3 Piping union
4 Flare nut




| Flare nut | Flare nut tightening torque |
|---|---|
| Ø6.4 mm (1/4") | 14.2~17.2 N•m (144~175 kgf•cm) |
| Ø15.9 mm (5/8") | 61.8~75.4 N•m (630~769 kgf•cm) |

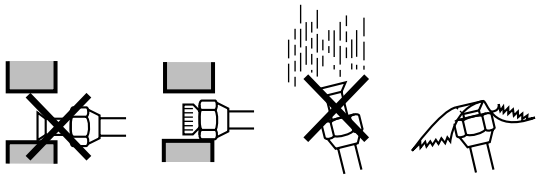
| Valve cap tightening torque | |
|---|---|
| Valve cap | Gas pipe |
| Ø6.4 mm (1/4") | 21.6~27.4 N•m (220~280 kgf•cm) |
| Ø15.9 mm (5/8") | 44.1~53.9 N•m (450~550 kgf•cm) |

| Service port cap tightening torque |
|---|
| 10.8~14.7 N•m (110~150 kgf•cm) |

## Refrigerant piping work

### Pipe handling guidelines

- Protect the open end of the pipe against dust and moisture.
- All pipe bends should be as gentle as possible. Use a pipe bender for bending.
  Bending radius should be 30 to 40 mm or larger.



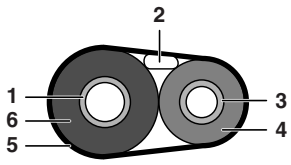
### Selection of copper and heat insulation materials

When using commercial copper pipes and fittings, observe the following:

- Insulation material: polyethylene foam
  Heat transfer rate: 0.041 to 0.052 kW/mK (0.035 to 0.045 kcal/mh°C)
  Refrigerant gas pipe's surface temperature reaches 110°C max.
  Choose heat insulation materials that will withstand this temperature.
- Be sure to insulate both the gas and liquid piping and to provide insulation dimensions as below.

| Pipe size | | Pipe insulation | |
|---|---|---|---|
| Outer diameter | Thickness | Inner diameter | Thickness |
| 6.4 mm (1/4") | 0.8 mm | 8-10 mm | ≥10 mm |
| 15.9 mm (5/8") | 1.0 mm | 16-20 mm | ≥13 mm |

| | |
|---|---|
| 1 | Gas pipe |
| 2 | Inter-unit wiring |
| 3 | Liquid pipe |
| 4 | Liquid pipe insulation |
| 5 | Finishing tape |
| 6 | Gas pipe insulation |




- Use separate thermal insulation pipes for gas and liquid refrigerant pipes.

## Purging air and checking gas leakage

When all piping work is completed and the outdoor unit is connected to the indoor unit, it is necessary to purge the air and check for gas leakage.

**WARNING**

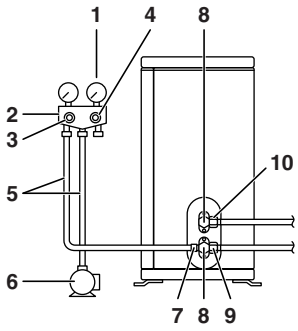
- Do not mix any substance other than the specified refrigerant (R410A) into the refrigeration cycle.
- When refrigerant gas leaks occur, ventilate the room as soon and as much as possible.
- R410A, as well as other refrigerants, should always be recovered and never be released directly into the environment.

**CAUTION**

Use a vacuum pump for R410A exclusively. Using the same vacuum pump for different refrigerants may damage the vacuum pump or the unit.

- If using additional refrigerant, perform air purging from the refrigerant pipes and indoor unit using a vacuum pump, then charge additional refrigerant.
- Use a hexagonal wrench (4 mm) to operate the stop valve rod.
- All refrigerant pipe joints should be tightened with a torque wrench at the specified tightening torque. See "Connecting the refrigerant piping to the outdoor unit" on page 4 for details.

| | |
|---|---|
| 1 | Pressure meter |
| 2 | Gauge manifold |
| 3 | Low-pressure valve (Lo) |
| 4 | High-pressure valve (Hi) |
| 5 | Charging hoses |
| 6 | Vacuum pump |
| 7 | Service port |
| 8 | Valve lids |
| 9 | Gas stop valve |
| 10 | Liquid stop valve |




**1** Connect the projection side (on which the worm pin is pressed) of the charging hose coming from the gauge manifold to the gas stop valve's service port.

**2** Fully open the gauge manifold's low-pressure valve (Lo) and completely close its high-pressure valve (Hi).
The high-pressure valve subsequently requires no operation.

**3** Apply vacuum pumping. Check that the compound pressure gauge reads –0.1 MPa (–760 mm Hg).

| | Pipe length | |
|---|---|---|
| | ≤15 m | >15 m |
| Run time | ≥10 minutes | ≥15 minutes |

**4** Close the gauge manifold's low-pressure valve (Lo) and stop the vacuum pump.

Leave as is for 4-5 minutes and make sure that the coupling meter needle does not go back.

**NOTE**

If the meter needle does go back, this may indicate presence of moisture or leaking from connecting parts. Repeat steps 2 through 4 after checking all connecting parts and slightly loosening and retightening the nuts.

**5** Remove the covers from the liquid stop valve and gas stop valve.

6 Turn the liquid stop valve's rod 90 degrees counterclockwise with a hexagonal wrench to open the valve.

Close it after 5 seconds, and check for gas leakage.

Using soapy water, check for gas leakage from the indoor unit's flare and the outdoor unit's flare and the valve rods.

After the check is complete, wipe all soapy water off.

7 Disconnect the charging hose from the gas stop valve's service port, then fully open the liquid and gas stop valves.

Do not attempt to turn the valve rod beyond its stop.

8 Tighten the valve lids and service port caps for the liquid and gas stop valves with a torque wrench at the specified torques. See "Connecting the refrigerant piping to the outdoor unit" on page 4 for details.

## Charging refrigerant

This outdoor unit is factory charged.

### Re-charging

In case re-charging is required, refer to the nameplate of the unit. The nameplate states the type of refrigerant and necessary amount.

### Charging additional refrigerant

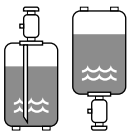
If the total length of refrigerant piping exceeds 10 m in length, additionally charge with 20 g of refrigerant (R410A) for each additional meter of piping.

Determine the weight of refrigerant to be charged additionally and fill in the amount in the service sticker on the rear side of the stop valve cover.

### Precautions when adding R410A

- Be sure to charge the specified amount of refrigerant in liquid state to the liquid pipe.
  Since this refrigerant is a mixed refrigerant, adding it in gas form may cause the refrigerant composition to change, preventing normal operation.
- Before charging, check whether the refrigerant cylinder is equipped with a siphon tube or not (the cylinder should be marked with "liquid filling siphon attached" or something similar).

Charge the liquid refrigerant with the cylinder in upright position.



Charge the liquid refrigerant with the cylinder in up-side-down position.

- Be sure to use tools exclusively for R410A to ensure required pressure resistance and to prevent foreign materials from mixing into the system.

## Wiring

**WARNING**

- All wiring must be performed by an authorized electrician.
- The power supply cable and circuit breaker must be selected in accordance with local and national regulations.
- Do not use tapped wires, stranded conductor wires (see caution 1 under "Notes to observe" on page 7), extension cords, or connections from a star system, as they may cause overheating, electrical shock or fire.
- Do not use locally purchased electrical parts inside the product and do not branch the power for the heater tape, etc., from the terminal block. Doing this may cause electrical shock or fire.
- Be sure to install an earth leakage circuit breaker. This unit uses an inverter, which means that an earth leakage circuit breaker capable of handling high harmonics needs to be used in order to prevent malfunctioning of the earth leakage circuit breaker itself.
- Use an all-pole disconnection type breaker with a contact separation of at least 3 mm inbetween all poles.

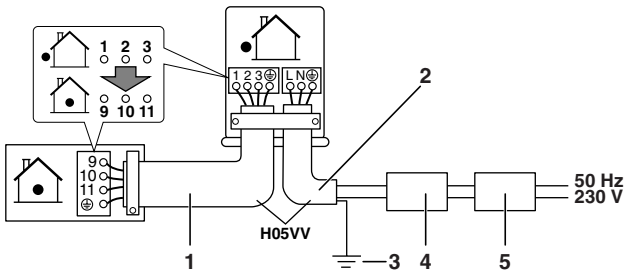
**WARNING**

Do not turn ON the safety breaker until all work is completed.

### Procedure

1 Strip the insulation from the wire (20 mm).

2 Connect the connection wires between the indoor and outdoor units **so that the terminal numbers match** (see wiring diagram below). Tighten the terminal screws securely. We recommend a flathead screwdriver to tighten the screws.
See also caution 2 under "Notes to observe" on page 7 for wiring guidelines.




**1** Interconnection between indoor unit and outdoor unit : when wire length exceeds 10 m, use Ø2.5 mm wires instead of Ø1.5 mm wires.

**2** Power supply cable
(refer to the unit nameplate for maximum running current)

**3** Earth

**4** Safety breaker

**5** Earth leakage circuit breaker

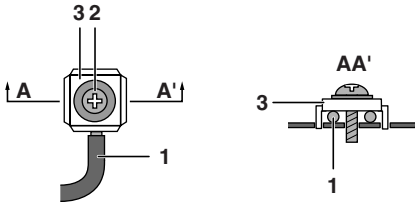
**3** Earth terminal installation

**NOTE**

This unit must be earthed.

For earthing, follow the applicable local standard for electrical installations.

■ Use the following method when installing single core wires.

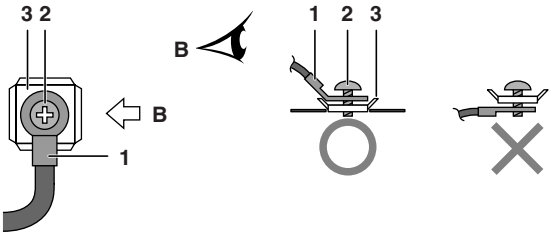



**1** Single core wire

**2** Screw

**3** Flat washer

■ Use the following method when using round crimp-style terminals.




**1** Round crimp-style terminal

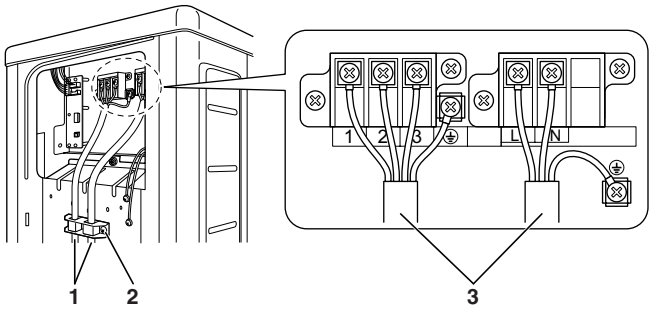
**2** Screw

**3** Flat washer

**4** Pull the connected wire and make sure that it does not disconnect. Then fix the wires in place in the wire clamp. See also "Notes to observe" on page 7.

## Notes to observe

Observe the notes mentioned below when wiring to the power supply terminal board.



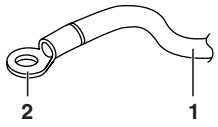

■ Use the specified wire type and connect it securely (1).

■ Firmly secure the wire clamp so that wire terminations do not receive external stress (2).

■ Shape wires so that the service cover and stop valve cover fit securely (3).

**CAUTION**

**1.** In case the use of stranded conductor wires is unavoidable for one reason or another, make sure to install round crimp-style terminals on the tip.
Place the round crimp-style terminal on the wire up to the covered part and fasten the terminal with the appropriate tool.




**1** Stranded conductor wire

**2** Round crimp-style terminal

**2.** When connecting the connection wires to the terminal board using a single core wire, be sure to perform curling.

Not executing the connections properly may cause heat and fire.
Strip the wire at terminal block:


**1** Strip wire end to this point

**2** Excessive strip length may cause electrical shock or leakage.

# TEST RUN AND FINAL CHECK

**NOTE** Remark that during the first running period of the unit, required power input may be higher than stated on the nameplate of the unit. This phenomenon originates from the compressor that needs elapse of a 50 hours run in period before reaching smooth operation and stable power consumption.

## Trial operation and testing

**1** Measure the voltage at the primary side of the safety breaker. Check that it is 230 V.

**2** Carry out the test operation in accordance with the indoor installation manual and operation manual to ensure that all functions and parts are working properly.

**NOTE**

- The unit requires a small amount of power in its standby mode. If the system is not to be used for some time after installation, shut off the circuit breaker to eliminate unnecessary power consumption.
- If the circuit breaker trips to shut off the power to the outdoor unit, the system will restore the original operation mode when the power supply is restored.

## Items to check

| | Check | Symptom |
|---|---|---|
| ☐ | Outdoor unit is installed properly on solid base. | Fall, vibration, noise |
| ☐ | No refrigerant gas leaks. | Incomplete cooling/heating function |
| ☐ | Refrigerant gas and liquid pipes are thermally insulated. | Water leakage |
| ☐ | System is properly earthed. | Electrical leakage |
| ☐ | The specified wires are used for interconnecting wire connections. | Inoperative or burn damage |
| ☐ | Outdoor unit air intake and exhaust is free of obstructions. Stop valves are opened. | Incomplete cooling/heating function |

**NOTE** Have the customer actually operate the unit while looking at the manual included with the indoor unit. Instruct the customer how to operate the unit correctly.

# PUMP DOWN OPERATION

In order to protect the environment, be sure to pump down when relocating or disposing of the unit. The pump down operation will extract all refrigerant from the piping into the outdoor unit.

## Pump down procedure

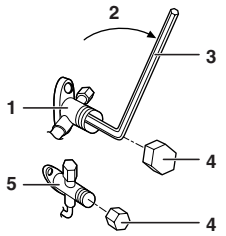
**1** Remove the valve lid from liquid stop valve and gas stop valve.

**2** Carry out the forced cooling operation.

**3** After 5 to 10 minutes (after only 1 or 2 minutes in case of very low ambient temperatures (<–10°C)), close the liquid stop valve with a hexagonal wrench.

**4** After 2-3 minutes, close the gas stop valve and stop forced cooling operation.

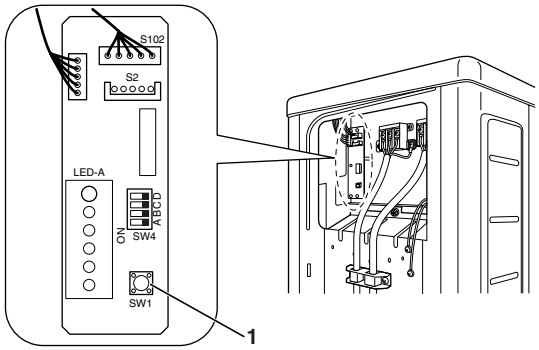
**1** Gas stop valve
**2** Close
**3** Hexagonal wrench
**4** Valve lid
**5** Liquid stop valve




## Forced cooling operation

**1** Press the forced operation switch SW1 to begin forced cooling.

**2** Press the forced operation switch SW1 again to stop forced cooling.




**1** Forced operation switch SW1

# DISPOSAL REQUIREMENTS

Dismantling of the unit, treatment of the refrigerant, of oil and of other parts must be done in accordance with relevant local and national legislation.

**DAIKIN EUROPE NV**

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